

CARTOGRAPHY AND GEOGRAPHIC INFORMATION SYSTEMS, BS

Hasn't everything already been mapped? Cartographers are not explorers charting borders in an ancient time. We are artists, community organizers, data scientists, visual storytellers, and full-stack web developers visualizing our world. In an era of massive data sets and location-based applications, maps and geospatial data have never been more important to assist in decision-making and envisioning our future.

The Cartography and Geographic Information Systems (GIS) major covers the conceptual foundations and technical skills needed to harness maps and geospatial data. Courses range from graphic design and web mapping to big-data analytics and mobile application development: all have important laboratory components working with industry-standard cartography and GIS technology. So, yes, everywhere has been mapped in some form, but in a dynamic world driven by information and technology, cartographers and GIS professionals are needed now more than ever to help us understand our changing planet.

HOW TO GET IN

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Requirements	Details
How to get in	No application required. All students who meet the requirements listed below are eligible to declare. For information on how to declare, visit Advising & Careers.
Courses required to get in	None
GPA requirements to get in	None
Credits required to get in	None
Other	None

REQUIREMENTS

UNIVERSITY REQUIREMENTS

All undergraduate students must complete both the following Core General Education (Core GenEd) and University Degree and Quality of Work requirements. The requirements below apply to students whose first term at UW-Madison or whose earliest post-high school college attendance at any institution is Summer 2026 or later.

Students whose first term at UW-Madison or whose earliest post-high school college attendance at any institution occurred before Summer 2026 should refer to the archived Guide (<https://guide.wisc.edu/archive/>) for the requirements that apply to them.

CORE GENERAL EDUCATION (CORE GENED) REQUIREMENTS

Civics & Perspectives	3 credits of Civics & Perspectives coursework.
Communication & Literacy	6 credits of Communication & Literacy coursework. This requirement may be partially satisfied by a qualifying placement test score. More information: https://go.wisc.edu/qualifyingenglishplacement (https://go.wisc.edu/qualifyingenglishplacement/)
Humanities & Arts	6 credits of Humanities & Arts coursework.
Mathematics & Quantitative Reasoning	6 credits of Mathematics & Quantitative Reasoning coursework. This requirement may be partially satisfied by a qualifying placement test score. More information: https://go.wisc.edu/qualifyingmathplacement (https://go.wisc.edu/qualifyingmathplacement/)
Natural Science & Wellness	Complete both: <ul style="list-style-type: none"> 6 credits of Natural Science & Wellness or Natural Science & Wellness + Laboratory coursework. one course must be in Natural Science & Wellness + Laboratory coursework.
Social & Behavioral Science	3 credits of Social & Behavioral Science coursework.
Total Credits	30 credits.

For more information see the policy (<https://policy.wisc.edu/library/UW-1095/>).

UNIVERSITY DEGREE AND QUALITY OF WORK REQUIREMENTS

All undergraduate degree recipients must complete the following minimum requirements. Requirements for some programs will exceed these requirements; see program requirements for additional information.

Total Degree	120 degree credits.
Residency	Complete 30 credits in residence. A course is considered "in residence" if it is taken when in undergraduate degree-seeking status and: <ul style="list-style-type: none"> is offered by UW-Madison and completed on the UW-Madison campus or at an approved off-site location, or is offered by UW-Madison in an online or distance format, or is completed during participation in a UW-Madison study abroad/study away program.
Quality of Work	Achieve at least the minimum grade point average specified by the school, college, and/or academic program.
Math	Demonstrate minimal mathematics competence by: <ul style="list-style-type: none"> placing above MATH#160;96, or successfully completing MATH#160;96, or successfully completing a more advanced mathematics course such as MATH#160;112, MATH#160;113, MATH#160;114, MATH#160;141, MATH#160;211, or MATH#160;221.

English Language If required to take the UW-Madison English as a Second Language Assessment Test (MSN-ESLAT), demonstrate minimal English language competence by:

- earning credit for ESL 118, or
- achieving a qualifying MSN-ESLAT placement test score.

Language Complete one:

- 2 high school units of a single language other than English, or
- one course with the second semester Language designation.

Major Declaration Declare and complete the requirements for at least one major.

COLLEGE OF LETTERS & SCIENCE DEGREE REQUIREMENTS: BACHELOR OF SCIENCE (BS)

Students pursuing a Bachelor of Science degree in the College of Letters & Science must complete all of the requirements below. Some courses satisfy more than one L&S degree requirement (visit College of Letters & Science: Requirements (<https://guide.wisc.edu/undergraduate/letters-science/#requirementstext>) for details).

This major can be paired with either the Bachelor of Arts or the Bachelor of Science degree requirements.

BACHELOR OF SCIENCE DEGREE REQUIREMENTS

Communication Complete both:

- Part A: one course with the Communication A designation or eligible UW Placement Score; and
- Part B: one course with the Communication B designation

Quantitative Reasoning Complete both:

- Part A: one course with the Quantitative Reasoning A designation or eligible UW Placement Score; and
- Part B: one course with the Quantitative Reasoning B designation

Ethnic Studies one 3+ credit course with the Ethnic Studies designation

Language the third unit of a language other than English

Mathematics Complete two courses of 3+ credits at the Intermediate or Advanced level in MATH, COMP SCI, or STAT subjects. A maximum of one course in each of COMP SCI and STAT subjects counts toward this requirement.

L&S Breadth: Humanities Complete 12 credits with the Humanities or Literature designation, which must include at least 6 credits with the Literature designation.

L&S Breadth: Social Sciences Complete 12 credits with the Social Science designation.

L&S Breadth: Natural Sciences Complete 12 credits, which must include both:

- 6 credits with the Biological Science designation, and
- 6 credits with the Physical Science designation.

Liberal Arts and Science (LAS) Coursework at least 108 credits

Depth of Intermediate/Advanced Coursework at least 60 credits at the Intermediate or Advanced level

Major Declare and complete at least one major.

Total Credits at least 120 credits

UW-Madison Experience

- 30 credits in residence, overall, and
- 30 credits in residence after the 86th credit

Quality of Work

- 2.000 in all coursework at UW-Madison
- 2.000 in Intermediate/Advanced level coursework at UW-Madison

NON-L&S STUDENTS PURSUING AN L&S MAJOR

Non-L&S students who have permission from their School/College to pursue an additional major within L&S only need to fulfill the major requirements. They do not need to complete the L&S Degree Requirements above.

REQUIREMENTS FOR THE MAJOR BREADTH

3 courses, 1 each from these areas:

Code	Title	Credits
Human Geography (1 course)		3
GEOG 101	Human Geography: Space, Place, Society, and Politics	
GEOG 104	Introduction to Human Geography	
GEOG/ART HIST/ ENVIR ST/ HISTORY/ LAND ARC 239	Making the American Landscape	
GEOG 300	Weird Geographies	
GEOG 301	Revolutions and Social Change	
GEOG 302	Economic Geography: Locational Behavior	
GEOG/ URB R PL 305	Introduction to the City	
GEOG 307	International Migration, Health, and Human Rights	
GEOG/CHICLA/ GEN&WS 308	Latinx Feminisms: Women's Lives, Work, and Activism	
GEOG/ INTL ST 311	The Global Game: Soccer, Politics, and Identity	
GEOG/ INTL ST 315	Universal Basic Income: The Politics Behind a Global Movement	
GEOG 318	Introduction to Geopolitics	

GEOG 340	World Regions in Global Context
GEOG 342	Geography of Wisconsin
GEOG 355	Africa, South of the Sahara
GEOG 358	Human Geography of Southeast Asia
GEOG/ AMER IND 410	Critical Indigenous Ecological Knowledges
GEOG 501	Space and Place: A Geography of Experience
GEOG/ URB R PL 503	Researching the City: Qualitative Strategies
GEOG/ GEN&WS 504	Feminist Geography: Theoretical Approaches
GEOG/ URB R PL 505	Urban Spatial Patterns and Theories
GEOG 507	Waste Geographies: Politics, People, and Infrastructures
GEOG 510	Economic Geography
GEOG 511	Critical Social Theory
GEOG 513	Queer Geographies
GEOG/ GEN&WS 514	Feminist Geography: Methodological Approaches
GEOG 515	Trans Autotheories
GEOG 518	Power, Place, Identity

People-Environment (1 course) 3

GEOG/ ENVIR ST 139	Global Environmental Issues
GEOG/ ATM OCN/ ENVIR ST 131	Climate Change, Climate Action: The Social Dimensions of Climate Change
GEOG/ART HIST/ ENVIR ST/ HISTORY/ LAND ARC 239	Making the American Landscape
GEOG/ ENVIR ST 309	People, Land and Food: Comparative Study of Agriculture Systems
GEOG/ ATM OCN/ ENVIR ST 332	Global Warming: Science and Impacts
GEOG/ ENVIR ST 333	Green Urbanism
GEOG/ ENVIR ST 336	International Environmental Governance
GEOG/ ENVIR ST 337	Nature, Power and Society
GEOG/ BOTANY 338	Environmental Biogeography
GEOG/ ENVIR ST 339	Conservation and Climate Change - Local to International Strategies
GEOG 340	World Regions in Global Context
GEOG 344	Changing Landscapes of the American West
GEOG/ AMER IND/ ENVIR ST 345	Caring for Nature in Native North America

GEOG 359	Australia: Environment and Society
GEOG/ AMER IND 410	Critical Indigenous Ecological Knowledges
GEOG/ENVIR ST/ URB R PL 431	Planning for Resilience to Natural Hazards
GEOG/C&E SOC/ ENVIR ST 434	People, Wildlife and Landscapes
GEOG/ ENVIR ST 439	US Environmental Policy and Regulation
GEOG/ENVIR ST/ HISTORY 460	American Environmental History
GEOG/ SOIL SCI 526	Human Transformations of Earth Surface Processes
GEOG/ ENVIR ST 534	Environmental Governance: Markets, States and Nature
GEOG/ ENVIR ST 537	Culture and Environment
GEOG 538	The Humid Tropics: Ecology, Subsistence, and Development
GEOG/ ENVIR ST 557	Development and Environment in Southeast Asia

Physical Geography (1 course) 3

GEOG/ ENVIR ST 120	Introduction to the Earth System
GEOG/ ENVIR ST 127	Physical Systems of the Environment
GEOG/ GEOSCI 320	Geomorphology
GEOG/ ATM OCN/ ENVIR ST 322	Polar Regions and Their Importance in the Global Environment
GEOG/ ATM OCN/ ENVIR ST 332	Global Warming: Science and Impacts
GEOG/ ATM OCN/ ENVIR ST/ GEOSCI 335	Climatic Environments of the Past
GEOG/ BOTANY 338	Environmental Biogeography
GEOG 342	Geography of Wisconsin
GEOG 344	Changing Landscapes of the American West
GEOG/ GEOSCI 420	Glacial and Pleistocene Geology
GEOG 523	Advanced Paleoecology: Species Responses to Past Environmental Change
GEOG/ SOIL SCI 525	Soil Geomorphology
GEOG/ SOIL SCI 526	Human Transformations of Earth Surface Processes

Total Credits 9

SKILLS, TECHNIQUES & METHODOLOGY

Code	Title	Credits
Core Cartography/GIS		
GEOG 370	Introduction to Cartography	4
GEOG/ENVIR ST/ G L E/GEOSCI/ LAND ARC 371 or GEOG 379	Introduction to Environmental Remote Sensing Geospatial Technologies: Drones, Sensors, and Applications	3
GEOG/CIV ENGR/ ENVIR ST 377	An Introduction to Geographic Information Systems	4
GEOG 378	Introduction to Geocomputing	4
Quantitative Methods (1 course)		3-4
GEOG 560	Advanced Quantitative Methods	
STAT 240	Data Science Modeling I	
STAT 301	Introduction to Statistical Methods	
STAT 324	Introduction to Statistics for Science and Engineering	
STAT 371	Introductory Applied Statistics for the Life Sciences	
Mathematics Proficiency		6
Complete one of the following by Placement or by completing the course		
MATH 112 & MATH 113	College Algebra and Trigonometry	
MATH 114	Precalculus	
Total Credits		24-25

DEPTH

Code	Title	Credits
Complete two of:		
GEOG/ENVIR ST/ LAND ARC/ URB R PL 532	Applications of Geographic Information Systems in Planning	7-8
GEOG 572	Graphic Design in Cartography	
GEOG 573	Advanced Geocomputing and Geospatial Big Data Analytics	
GEOG 574	Geospatial Database Design and Development	
GEOG 575	Interactive Cartography & Geovisualization	
GEOG 576	Geospatial Web and Mobile Programming	
GEOG 578	GIS Applications	
GEOG 579	GIS and Spatial Analysis	
Total Credits		7-8

CAPSTONE

Code	Title	Credits
Complete one of:		
GEOG 565	Colloquium for Undergraduate Majors	3-6
GEOG 681 & GEOG 682	Senior Honors Thesis and Senior Honors Thesis	

GEOG 691 & GEOG 692	Senior Thesis and Senior Thesis	
Total Credits		3-6

RESIDENCE AND QUALITY OF WORK

- 2.000 GPA in GEOG and major courses
- 2.000 GPA on 15 upper-level credits, taken in residence²
- 15 credits in GEOG, taken on the UW–Madison campus

² GEOG courses designated Intermediate/Advanced are upper level in this major.

HONORS IN THE MAJOR

Students may declare Honors in the Cartography and GIS Major in consultation with the Geography undergraduate advisor.

HONORS IN THE CARTOGRAPHY AND GEOGRAPHIC INFORMATION SYSTEMS MAJOR REQUIREMENTS

To earn Honors in the Major in Cartography and Geographic Information Systems, students must satisfy both the requirements for the major (above) and the following additional requirements:

- Earn a 3.300 overall university GPA
- Earn a 3.300 GPA for all GEOG courses, and all courses accepted in the major
- Complete GEOG 578: GIS Applications with a grade of B or better
- Complete at least one advanced-level course OR 6 credits of honors credits in the major at the 300 level or above
- Complete a two-semester Senior Honors Thesis in GEOG 681 Senior Honors Thesis and GEOG 682 Senior Honors Thesis, a piece of original research composition, for a total of 6 credits.

LEARNING OUTCOMES

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1. Apply cartographic design principles and visual storytelling to transform geospatial data into actionable insights.
2. Apply appropriate technologies and methods, including geographic information systems (GIS) and informed geodatabase design, to analyze qualitative and quantitative geospatial data.
3. Use appropriate geographic concepts, methods, and technologies to interpret the dynamic interactions among human and natural characteristics of place and space.
4. Combine geospatial theories, methodologies, and project management strategies to design and conduct ethical cartographic and geographic research and development.
5. Utilize appropriate GIS-based spatial decision tools to inform discussions of social, economic, and environmental issues that confront policymakers and citizens.
6. Discuss complex geospatial data, concepts, and technologies using written, oral, and visual forms of communication appropriate for technical, non-technical, and community-based audiences.

FOUR-YEAR PLAN

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This Four-Year Plan is only one way a student may complete an L&S degree with this major. Many factors can affect student degree planning, including placement scores, credit for transferred courses, credits earned by examination, and individual scholarly interests. In addition, many students have commitments (e.g., athletics, honors, research, student organizations, study abroad, work and volunteer experiences) that necessitate they adjust their plans accordingly. Informed students engage in their own unique Wisconsin Experience by consulting their academic advisors, Guide, DARS, and Course Search & Enroll for assistance making and adjusting their plan.

First Year

Fall	Credits Spring	Credits
MATH 112	3 MATH 113	3
Communication A	3 Ethnic Studies	4
Language	4 Language	4
Humanities Breadth	3 Literature Breadth	3
Elective	2	
	15	14

Second Year

Fall	Credits Spring	Credits
STAT 301	3 GEOG/CIV ENGR/ ENVIR ST 377	4
GEOG 370	4 Communication B	4
INTER-LS 210	1 Biological Science Breadth	3
Literature Breadth	3 Elective	4
Elective	4	
	15	15

Third Year

Fall	Credits Spring	Credits
GEOG 378	4 500-level Cartography/ GIS Elective	4
Major course: Human Geography	3-4 Biological Science Breadth	3
Electives	9 Humanities Breadth	3
	Major course: People- Environment Geography	3-4
	16	14

Fourth Year

Fall	Credits Spring	Credits
GEOG/ENVIR ST/G L E/ GEOSCI/LAND ARC 371	3 500-level Cartography/ GIS Elective	4
Major course: Physical Geography	4 Electives	12
GEOG 565	3	
Electives	5	
	15	16

Total Credits 120

ADVISING AND CAREERS

ADVISING AND CAREERS

DECLARE OR CANCEL THIS MAJOR

Please follow the process described on the Geography website (<https://geography.wisc.edu/undergraduate/geography-major/#advising-and-declaring-the-major>).

Students with questions about the major, courses, and careers are encouraged to contact the Geography undergraduate advisor.

CAREERS

Cartography and Geographic Information Systems is a booming professional path. Mapping and geospatial analysis tools have become increasingly essential in industries as varied as transportation and urban planning, environmental science and conservation, national security, disaster management and mitigation, engineering, surveying, health and epidemiology, archaeology, history, and public safety. The U.S. Bureau of Labor Statistics estimates 6% employment growth in the field between 2024 and 2032 (<https://www.bls.gov/ooh/architecture-and-engineering/cartographers-and-photogrammetrists.htm>), faster than the average rate of other industries. Alumni who learned GIS skills through this major work in local, national, and international government positions; Apple, Google, Facebook, Uber, and other large companies; and media outlets such as National Geographic, The New York Times, Reuters, and The Wall Street Journal. See some examples of GIS professionals at work (<https://www.esri.com/en-us/what-is-gis/careers/>).

STUDY ABROAD

Learning in Letters & Science emphasizes discovery, growth, understanding different perspectives, and challenging yourself, which makes studying abroad an excellent fit for many L&S students: studyabroad.wisc.edu (<https://studyabroad.wisc.edu/>)

As a university with global influence, we have more than 300 study abroad programs (<https://studyabroad.wisc.edu/programs/>) in over 80 countries. These vary in length, academic focus, teaching format, language requirements, cost, and level of independence. There are many programs to complement every major (<https://studyabroad.wisc.edu/academics/major-advising-pages-maps/#L&S>) and any year of college (including the final semester)—and all meet UW–Madison’s high academic standards. Students admitted into Letters & Science can even choose a short program in the summer before they start college or their whole first year: studyabroad.wisc.edu/launch (<http://studyabroad.wisc.edu/launch/>). Talk with your academic advisor about how studying abroad might fit with your academic plan.

SUCCESSWORKS

SuccessWorks (<https://successworks.wisc.edu/>) at the College of Letters & Science helps you turn the academic skills learned in your classes into a fulfilling life, guiding you every step of the way to securing jobs, internships, or admission to graduate school.

Through one-on-one career advising, events, and resources, you can explore career options, build valuable internship and research experience, and connect with supportive alumni and employers who open doors of opportunity.

- What you can do with your major (<https://successworks.wisc.edu/what-you-can-do-with-your-major/>) (Major Skills & Outcomes Sheets)
- Make a career advising appointment (<https://successworks.wisc.edu/make-an-appointment/>)
- Learn about internships and internship funding (<https://successworks.wisc.edu/finding-a-job-or-internship/>)
- Try “Jobs, Internships, & How to Get Them,” (<https://successworks.wisc.edu/canvas/>) an interactive guide in Canvas for enrolled UW-Madison students